



Scale: 5" / 100'
Measured Depth Log

Well Name Brotmarkle 3N-13HZ

Location SESW: SEC: 13 TWP: 3N 66W 6 PM

State COLORADO

Country U.S.A.

API Number 05123363990000

Region DJ BASIN

Spud Date 3/31/2014

Surface Coordinates 319' FSL, 2048' FWL

Bottom Hole Coordinates 460' FNL, 1715' FWL

Ground Elevation 5,033'

Logged Interval 6750' To 11,753'

Formation NIOBRARA

Type of Drilling Fluid LSND/ PHPA

County WELD

Rig Number XTREME 6

AFE # 2075083.DRL

Field WATTENBERG

Drilling Completed 4/6/2014

K.B. Elevation 5,053'

Total Depth 11,753'

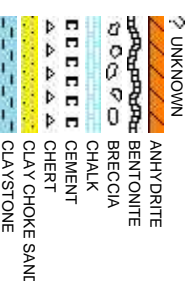
Company Anadarko

Address Granite Tower
1099 18th St. #
Denver, CO 802
(JG)(KB)

Name ISAAC SMITH &

Company COLUMBINE L

Address 2385 S. Lipan S
Denver, CO 802
Phone: 303-289



Operator

1800
202

Geologist

LOGGING INC.















































Street
223
0-7764

Rock Types

Symbol	Rock Name	Symbol	Rock Name
	CONGLOMERATE		MARLSTONE
	DOLomite		METAMORPHIC
	DOLomitic LIMESTONE		NO SAMPLE
	GRANITE		SANDSTONE
	GYPSUM		SALT-PEPPER SAND
	IGNEOUS		SHALE
	SIDERITE or LIMONITE		SHALE COLORED
	LIMESTONE		SHALE GRAY
	DOLomite		SHALY SANDSTONE
	DOLomite		SHALY SILTSTONE
	DOLomite		SILTY SHALE
	DOLomite		SILTSTONE
	DOLomite		TUFF
	DOLomite		WELDED TUFF

Accessories

Fossils




	GASTROPOD		ARGILLITE GRAIN		HEAVY MINERAL		Stringer
	INOCERAMUS		B BENTONITE		KAOLIN		ANHYDRITE STRINGER
	ALGAE		O OOLITE		MARCASITE		BENTONITE STRINGER
	AMPHIPORA		O OSTRACOD		MARLSTONE		COAL STRINGER
	BELEMNITE		P PELITE		MICACEOUS		DOLOMITE STRINGER
	BIOLCLASTIC		P PELLET		MINERAL CRYSTALS		GYPSUM STRINGER
	BRACHIOPOD		P PISOLITE		NODULES		LIMESTONE STRINGER
	BRYOZOA		P PLANT REMAINS		PHOSPHATE PELLETS		MARLSTONE (CALC) STRG
	CEPHALOPOD		S PLANT SPORES		SALT CAST		MARLSTONE (DOL) STRG
	CORAL		S SCAPHOPOD		SANDY		SHALE STRINGER
	CRINOID		STROMATOPOROID		FELDSPAR		
	ECHINOID		F FERRUGINOUS PELLET		SIDERITE		

Minerals

6 FORAMINIFERA // ANHYDRITIC
 F FOSSIL - ARGILLACEOUS // GLAUCONITE
 // GYPSEIFEROUS
 // SILTY
 // TUFFACEOUS

Other Symbols

Oil Show

	P	PINPOINT
	V	VULGY
	F	FAULT
	D	DST INTERVAL
	W	WIRELINE TESTED - LEFT
	R	WIRELINE TESTED - RT
	F	FINELY
	E	EARTHLY

Engineering

- EVEN
- QUESTIONABLE
- BIT
- ✖ GAS SHOW
- OIL SHOW
- MN DEPTH
- MN DEPTH
- ✖ LITHOGRAPHIC
- ✖ MICROXIN

SPOTTED STAINING: CONNECTION (UP)

Rounding

Rounding

Porosity

▼ CONNECTION (DOWN) MIN DEPTH (DOWN) ▲ ANGULAR PS PACKSTONE

E EARTHY

 CONNECTION GAS (LEFT)
 OVERTURNED STRATA
 SUBANG

 TRIP GAS
 REVERSE FAULT
 SUBRND

Sorting

F FRACTURE

TRIP GAS (LEFT) CASING MODERATE

	DOWN TIME GAS		SIDEWALL CORE (LEFT)		POOR
	DOWN TIME GAS (LEFT)		SIDEWALL CORE (RIGHT)		BOUNDSTONE
			WELL		

ORGANIC

↓ CORE - LOST SLIDE C CHALKY
 CORE - RECOVERED SURVEY CXX CRYPTOXLN

Slide/Rotate

BEGIN BROTEMARKE 3N-13HZ @ 6700' MD,
DRILLING 8.75" HOLE. BIT #1, SMITH, SD1611.
DEPTH IN: 1312' MD. KOP: 6700' MD.

ROP
ROF
GAMMA

ROP & GAS DATA PROVIDED BY IBALL/
BLOODHOUND - GAMMA & SURVEY DATA
PROVIDED BY BAKER HUGHES

COLUMBINE LOGGING INC., 2-MAN LOGGING
CREW 4/2/2014 - BLOODHOUND UNIT #0787

MISWACO MPD (MANAGED PRESSURE
DRILLING) SERVICES ARE NO LONGER ON
LOCATION. NOT DRILLING UNDERBALANCED.

GAS
C1
C2
C3
C4

PIERRE SHALE

GAS TEST AT
BLOODHOUND

NO GAS DATA COLLECTED - NOT CALLED OUT TO LOCATION IN S
TIME TO UNPACK AND RIG-UP INSIDE AND OUT BEFORE KOP.

GAS (units)
C1-C4 (PPM)

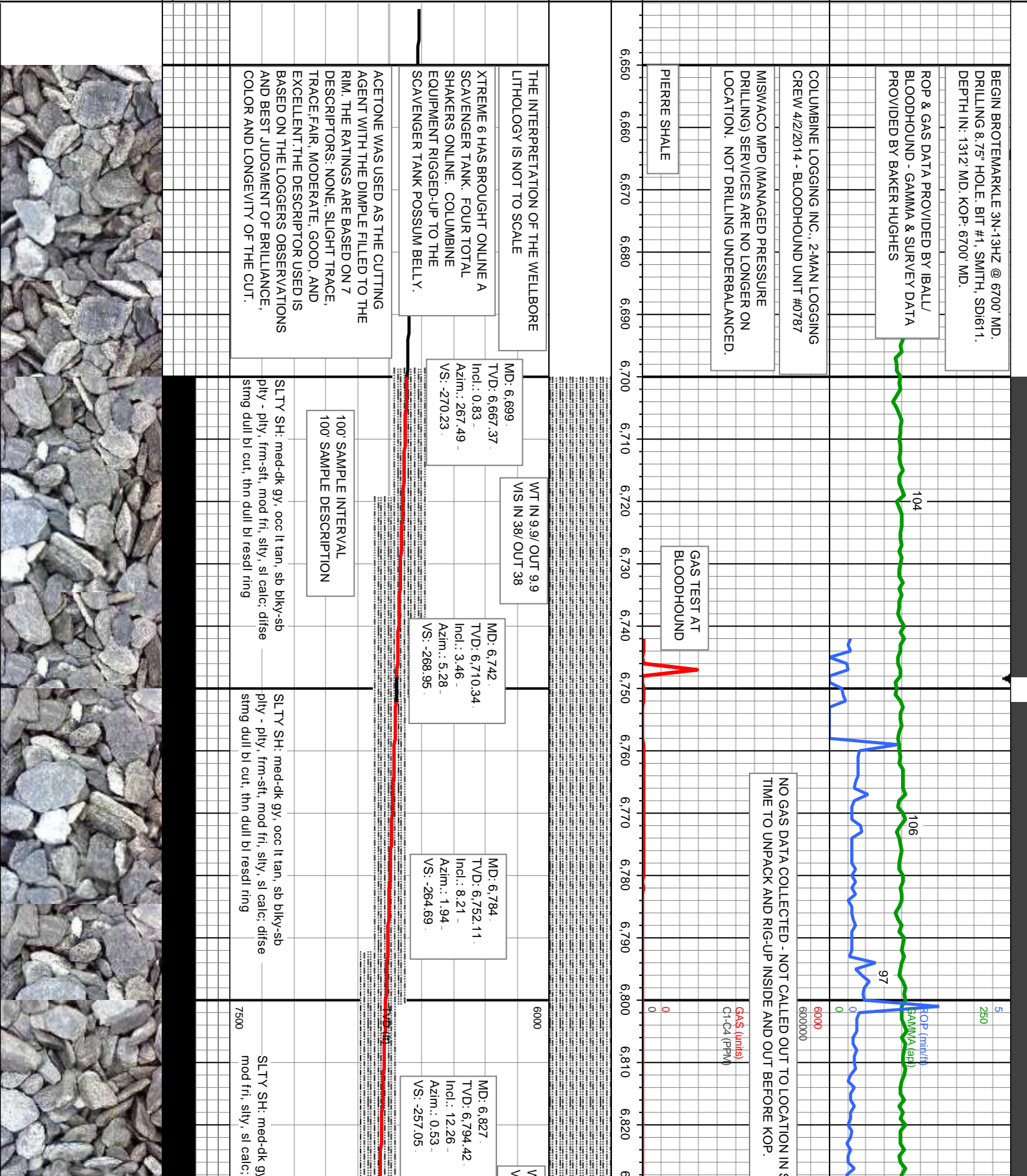
Depth Labels

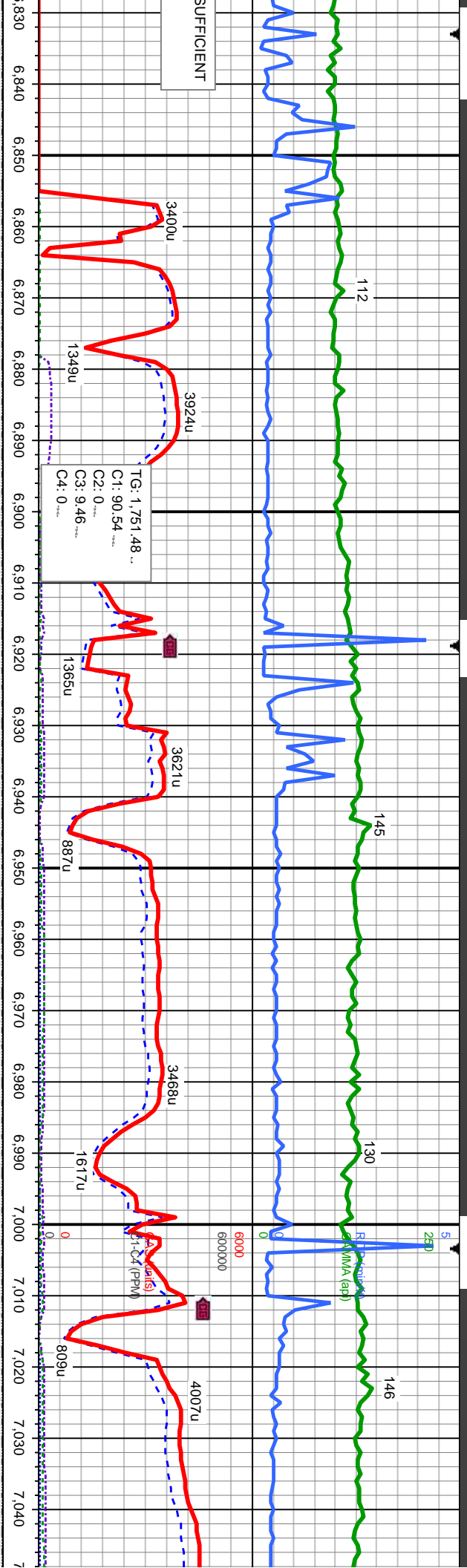
% Lith

Well Bore
TVD

Oil Show

Images





WT IN 10.0/ OUT 10.0
VIS IN 39/ OUT 39

MD: 6.870.
TVD: 6.836.18.
Incl.: 15.3 -
Azim.: 2.61 -
VS: -246.82

MUD DATA
WT: 10.0
FV: 41
PV: 12
YP: 11
CK: 1/4
Sol: 9
pH/Temp: 9.5 @ 118F
Chl: 1,800

MD: 6.912.
TVD: 6.876.17.
Incl.: 20.16 -
Azim.: 0.11 -
VS: -234.04

MD: 6.955.
TVD: 6.915.88.
Incl.: 24.91 -
Azim.: 358.58 -
VS: -217.57

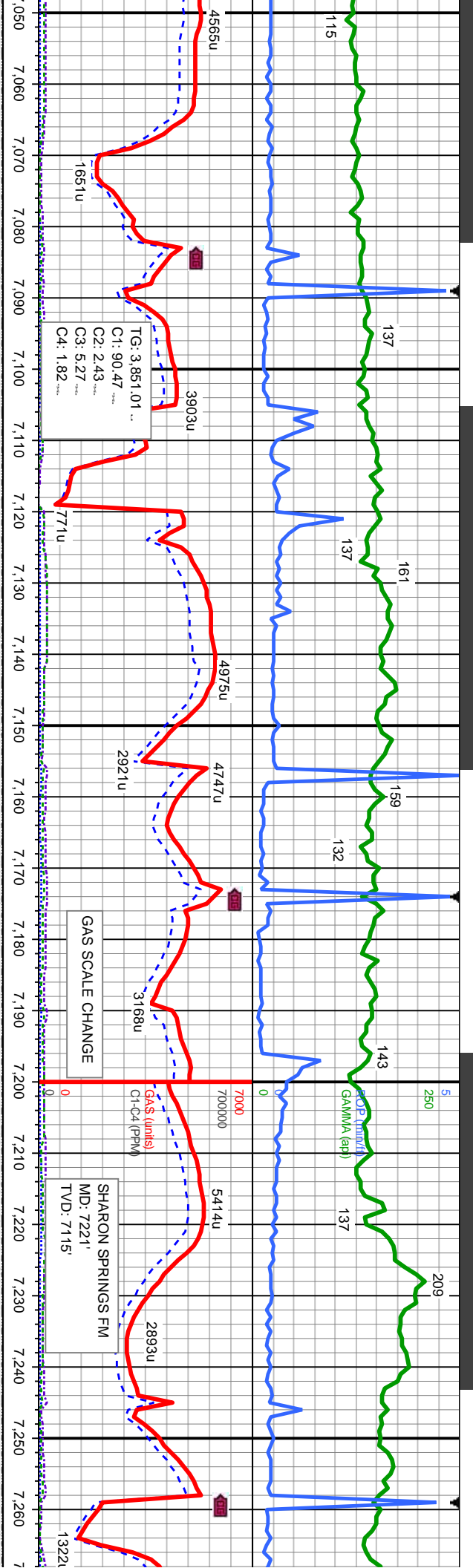
MD: 6.997.
TVD: 6.953.1.
Incl.: 30.2 -
Azim.: 358.28 -
VS: -198.15

MD: 7.040.
TVD: 6.989.16.
Incl.: 35.75 -
Azim.: 359.34 -
VS: -174.76

occ sl tan, sb blk-y-sb pily - pily, mod frm -frm,
difse string dull bl cut, thn dull bl resdl ring

SLTY SH: med-dk gy, occ sl tan, sb blk-y-sb pily - pily, mod frm -frm,
mod fri, silty, sl calc, difse string dull bl cut, thn dull bl resdl ring





50' SAMPLE INTERVAL
50' SAMPLE DESCRIPTION

MD: 7.083
TVD: 7,022.71
Incl: 41.6 -
Azim: 0.03 -
VS: -147.9

MD: 7.125
TVD: 7,053.07
Incl: 45.8 -
Azim: 0.84 -
VS: -118.89

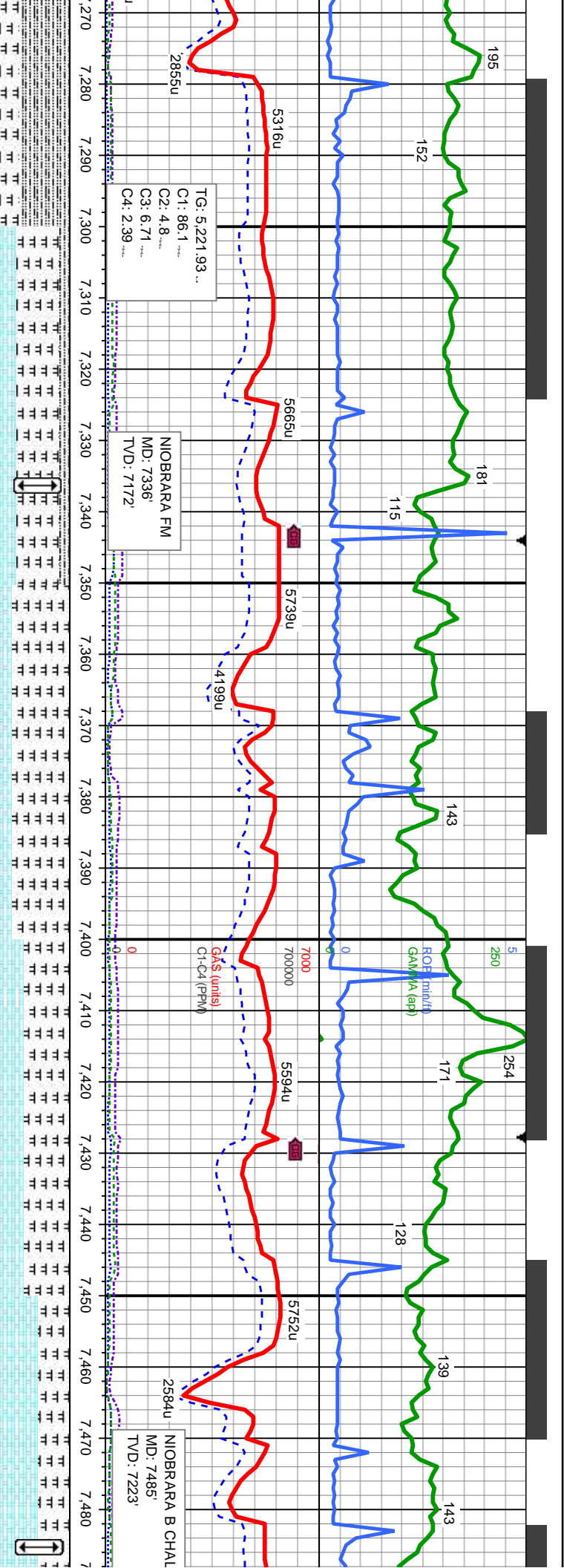
MD: 7.168
TVD: 7,082
Incl: 49.62 -
Azim: 1.42 -
VS: -87.1

MD: 7.210
TVD: 7,108.34
Incl: 52.71 -
Azim: 1.78 -
VS: -54.4

MD: 7.253
TVD: 7,132.77
Incl: 58 -
Azim: 1.93 -
VS: -19.06

SLTY SH: med-dk gy, occ sl tan, sb blk-y-sb ply - ply, mod frm -frm, mod fri, slty, sl calc; disse sting dull bl cut, thn dull bl resdl ring	SLTY SH: med-dk gy, occ sl tan, sb blk-y-sb ply - ply, mod frm -frm, mod fri, slty, sl calc, abnt bent, rr cal frags, disse sting dull bl cut, thn dull bl resdl ring	SLTY SH: med-dk g arg-sl slty, mod ce rr sl tan, sb ply - f calc, abnt bent, rr mod-g bl-wh cut, t
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MD: 7.296.
TVD: 7.154.49.
Incl.: 61.33 -
Azim.: 0.53 -
VS: 18.03

WT IN 10.0/ OUT 10.0
VIS IN 41/ OUT 41

MD: 7.336.
TVD: 7.172.48.
Incl.: 65.21 -
Azim.: 359.34 -
VS: 53.75

WT IN 10.0/ OUT 10.0
VIS IN 45/ OUT 44

MD: 7.379.
TVD: 7.189.75.
Incl.: 67.42 -
Azim.: 359.44 -
VS: 93.13

MD: 7.422.
TVD: 7.205.08.
Incl.: 70.8 -
Azim.: 359.54 -
VS: 133.29

MD: 7.464.
TVD: 7.217.83.
Incl.: 73.85 -
Azim.: 0.1 -
VS: 173.31

v, sb blk-y-sb pily, mod sft-frm, arg-calc, SLTY SH, med-dk gy, blk, mod frm-frm, fri, silty, v sl cal frags, difse hvy sting wi thk bl ring	MRLST: med-dk gy, sb blk-y-sb pily, mod sft-frm, arg-si silty, mod calc-calc, SLTY SH, med-dk gy, rr sl tan, sb pily - pily, mod frm-frm, fri, silty, v sl calc, abnt bent, tr cal frags, difse hvy sting wi mod-g bl-wh cut, thk bl ring	MRLST: med-dk gy, sb blk-y-sb pily, mod sft-frm, arg-si silty, mod calc-calc, CHK: med gy-ilt gy, mot tex, sb blk-y-sb pily, mod sft-si frm, v calc, tr bent, difse hvy sting wi mod-g bl-wh cut, thk bl ring	MRLST: med-dk gy, sb blk-y-sb pily, mod sft-frm, arg, mod calc, CHK: med gy-ilt gy, si mot tex, sb blk-y-sb pily, mod sft-si frm, v calc, si arg, rr calc frags, difse hvy sting wi mod-g bl-wh cut, thk bl ring	CHK: med gy-ilt gy, rr dk gy, mot tex, sb blk-y-sb pily, mod sft-si frm, v calc, arg, MRLST: med-dk gy, sb blk-y-sb pily, mod sft-frm, arg, mod calc, rr calc frags, difse hvy sting wi mod-g bl-wh cut, thk bl ring
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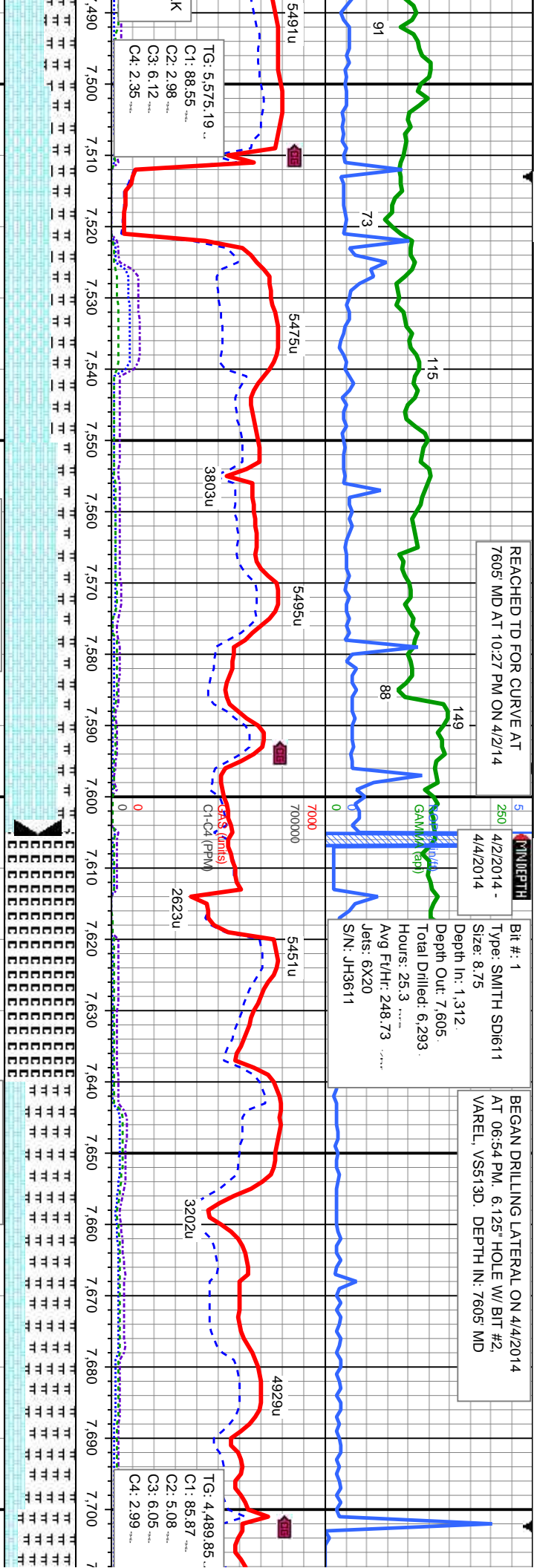


REACHED TD FOR CURVE AT
7605 MD AT 10:27 PM ON 4/2/14

DATE
4/2/2014 -
4/4/2014

Bit #: 1
Type: SMITH SD611
Size: 8.75
Depth In: 1.312
Depth Out: 7.605
Total Drilled: 6,293
Hours: 25.3
Avg Ft/Hr: 248.73
Jets: 6X20
S/N: JH3611

BEGAN DRILLING LATERAL ON 4/4/2014
AT 06:54 PM. 6.125' HOLE W/ BIT #2.
VAREL, VS513D. DEPTH IN: 7605 MD



TG: 5.575.19 ..
C1: 88.55
C2: 2.98
C3: 6.12
C4: 2.35

TG: 4.489.85 ..
C1: 85.87
C2: 5.08
C3: 6.05
C4: 2.99

MUD DATA

MD: 7.507
TVD: 7,228.59
Incl: 77.16
Azim: 0.57
VS: 214.93

MD: 7.548
TVD: 7,236.36
Incl: 80.98
Azim: 359.93
VS: 255.18

WT: 10.0
FV: 44
PV: 12
YP: 12
CK: 1/1
pH/Temp: 9.4 @ 124F
Chi: 1,900

PROJECTION TO BIT

MD: 7.605
TVD: 7,241.58
Incl: 88.5
Azim: 359.93
VS: 311.9

MD: 7.610
TVD: 7,242.55
Incl: 87.62
Azim: 359.48
VS: 319.85

MD: 7.664
TVD: 7,244.22
Incl: 87.5
Azim: 2.47
VS: 363.82

100' SAMPLE INTERVAL
100 SAMPLE DESCRIPTION

WT IN 9.2/ OUT 9.2
VIS IN 43/ OUT 41

CHK: med gy-ll gy, rr dk gy, sl mot tex, sb
biky-sb pty, mod sft-sl frm, v calc, sl arg,
MRLST: aa, rr bent, v fast difse, sting bri
bl-wh mky cut; thn bri bl-wh resd ring

CHK: med gy-ll gy, mot tex, occ sl gt, sb
biky-sb pty, mod sft-sl frm, v calc, sl arg,
MRLST: aa, v calc, occ bent, v fast difse, sting
bri bl-wh mky cut; thn bri bl-wh resd ring

MRLST: med-dk gy, sb biky-sb pty, mod sft-frm, arg, mod calc, occ bent,
rr calc frags; CHK: med gy-ll gy, mot tex, sl gt, sb biky, mod sft-sl frm, v
calc, arg; v fast difse, sting bri bl-wh mky cut; thn bri bl-wh resd ring

TOOH MWD TOOLS AT 8133'
MD. AT 11:56PM ON 4/4/2014

4/5/2014

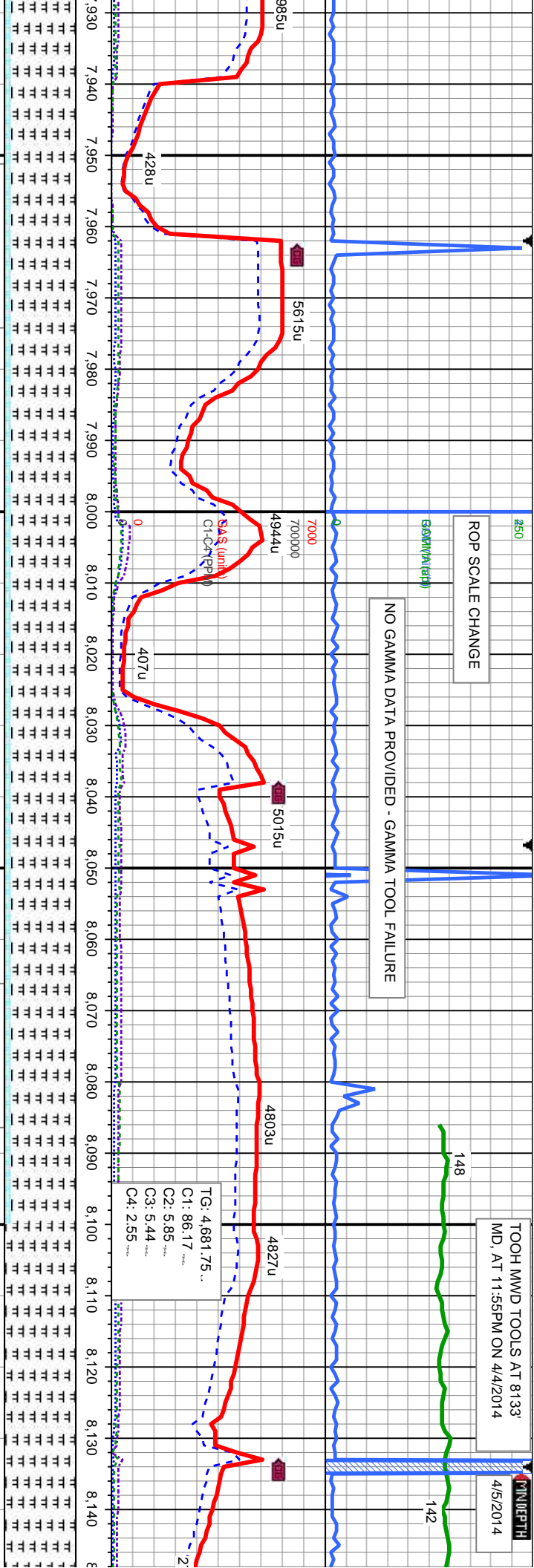
ROP SCALE CHANGE

GAMMA (api)

NO GAMMA DATA PROVIDED - GAMMA TOOL FAILURE

148

142



MUD DATA

WT: 9.2
FV: 46
PV: 11
YP: 14
CK: 1/
Sol: 5.5
pH/ Temp: 9.6 @ 80F
Chl: 2,800

MD: 7.992
TVD: 7,247.97
Incl.: 90.09
Azim.: 358.16
VS: 698.76

TVD (ft)

WT IN 9.2/ OUT 9.2
VIS IN 42/ OUT 44

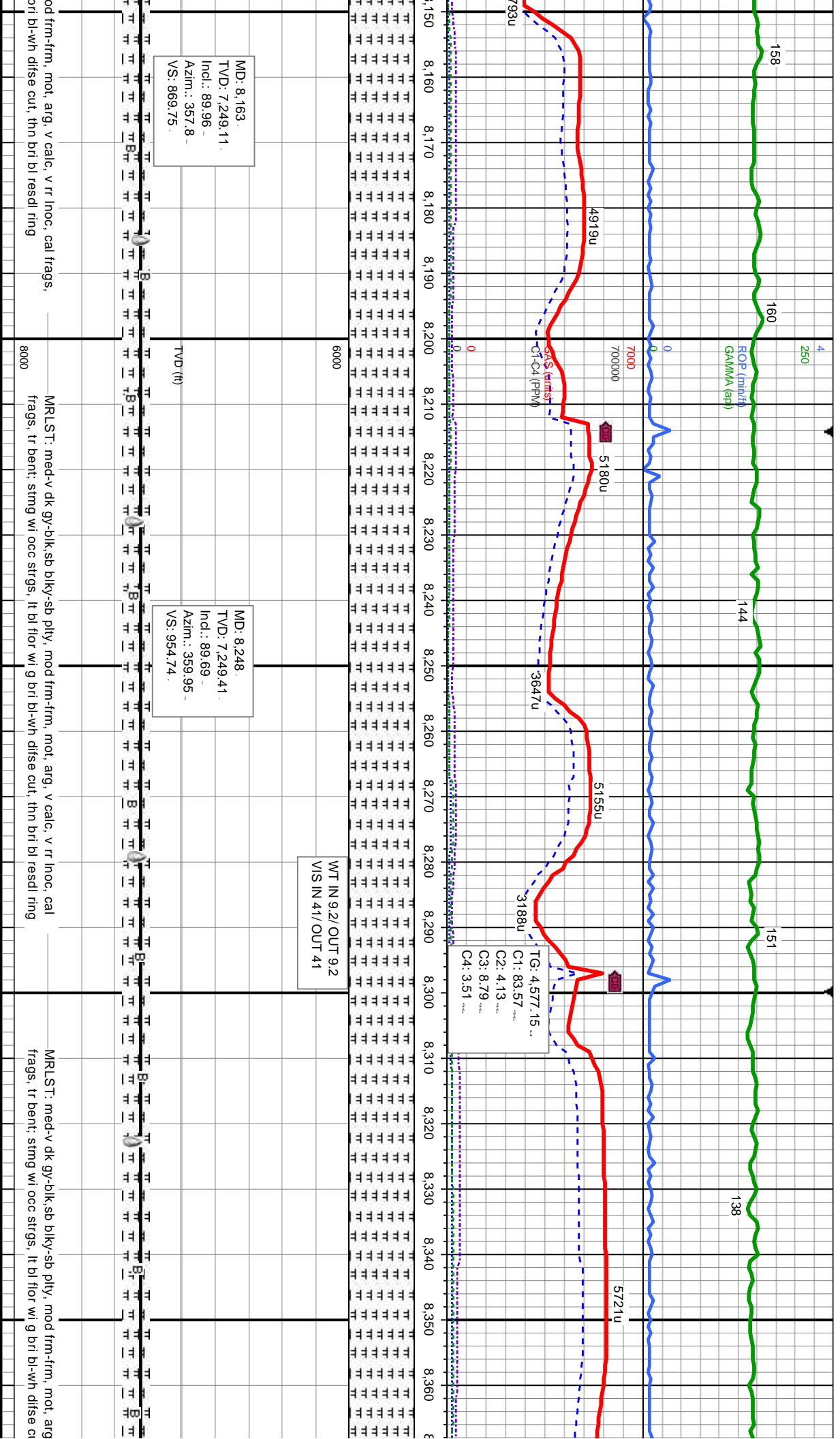
MD: 8.078
TVD: 7,248.42
Incl.: 90.24
Azim.: 357.2
VS: 784.76

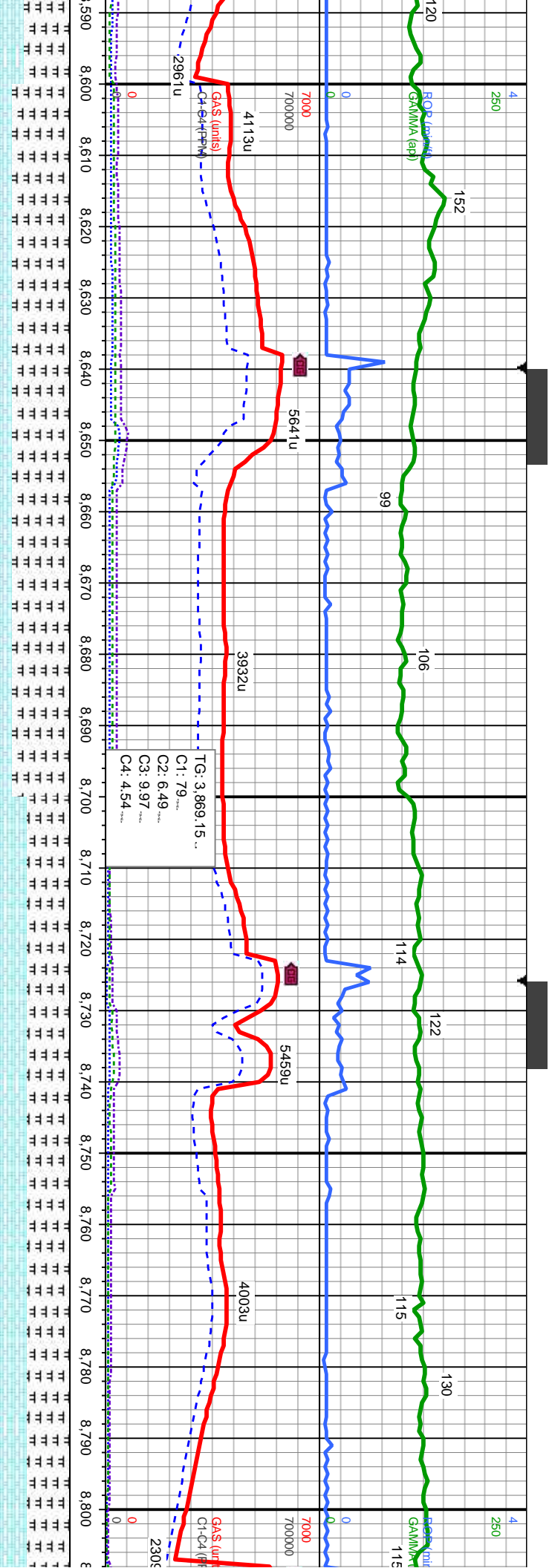
v, sb blk-y-sb pily, mod sft-frm, arg, mod calc, occ calc frags,
sl mot tex, sb blk-y-sb pily, mod sft-sl frm, sl arg, v calc;
lt bl flr wi g bri bl-wh disse cut, thn bri bl resd ring

MRLST: med-dk gy, sb blk-y, mod frm-frm, arg, mod calc, rr calc frags,
CHK: med gy-lt gy, sl mot tex, sb blk-y-sb pily, sft-sl frm, sl arg, v calc;
stmg wi occ strgs, lt bl flr wi g bri bl-wh disse cut, thn bri bl resd ring

MRLST: med-v dk gy-blk-sb blk-y-sb pily, m
com bent; stmg wi occ strgs, lt bl flr wi g

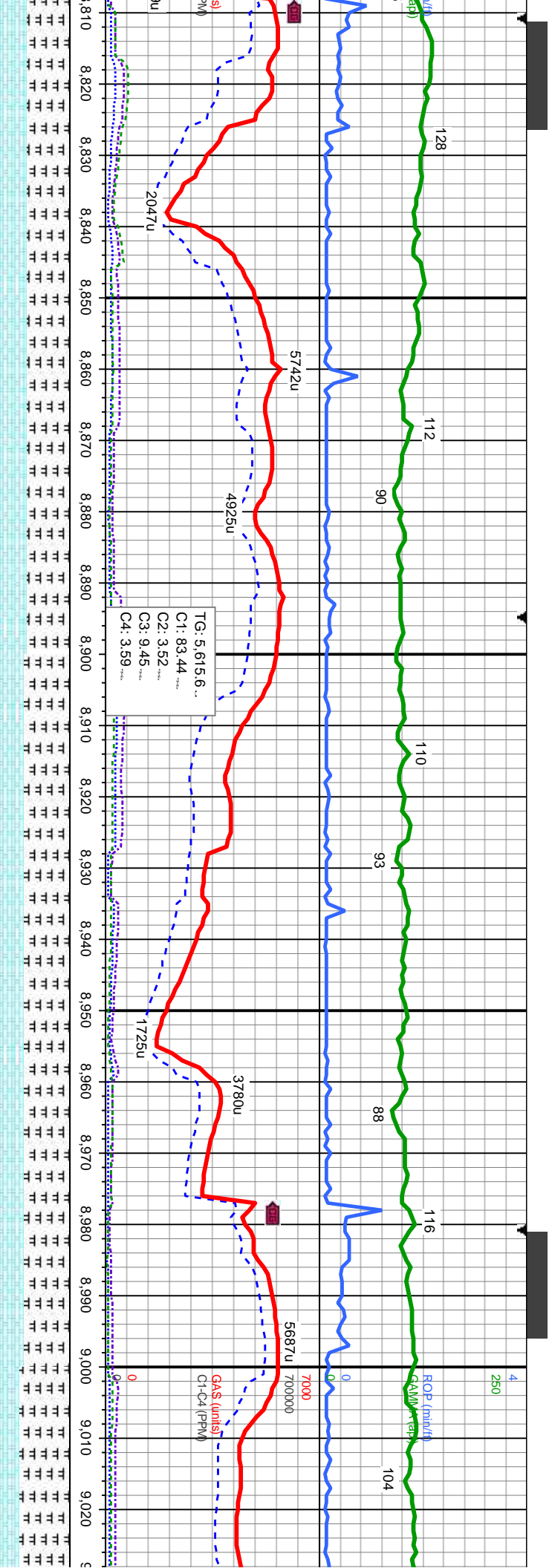






590	7,244.05	6000	WT IN 9.2/OUT 9.5	6000	WT IN 9.3/OUT 9.5
31.58			VIS IN 45/ OUT 38		VIS IN 45/ OUT 40
358.86					
296.65					
TVD (ft)					TVD (ft)
MRLST: med-v dk gy-blk, sb blk-y-sb pily, mod frm-firm, mot, arg, v calc, abnt Inoc, cal frags, tr bent; CHK: med gy-lt-med brn, mot, sb blk-y-sb pily, sft-sl frm, v calc; sting wi occ strgs, lt bl flwr wi g bri bl-wh difse cut, thn bri bl resd ring					
8000					8000





WT IN 9.3/ OUT 9.5
VIS IN 43/ OUT 41

MD: 8.930
TVD: 7.238.68
Incl.: 90.62
Azim.: 359.92
VS: 1.636.59

TVD (ft)

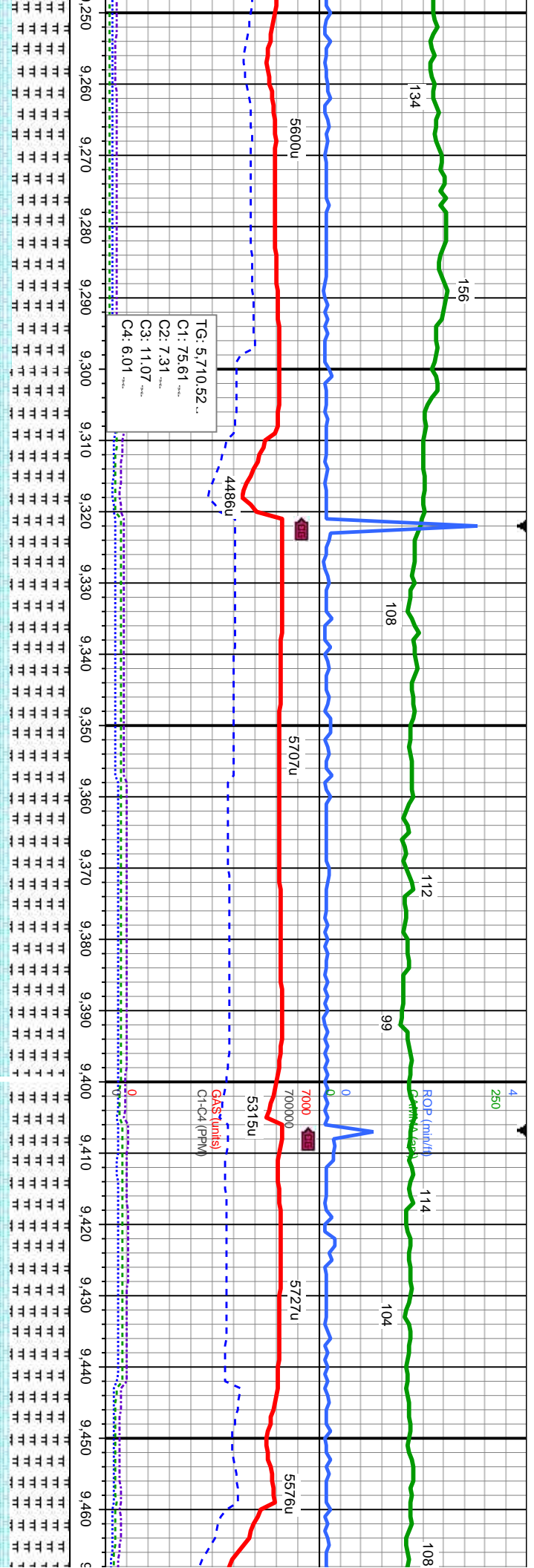
WT IN 9.2/ C
VIS IN 42/ O

MRLST: med gy-blk, sb blky-sb ply, mod frm-firm, mot, arg, v calc, abnt inoc, cal frags, v tr bent; CHK: med gy-lt-med brn, mot, sb blky-sb ply, sft-sl frm, v calc; sting wi occ strgs, lt bl flr wi g bri bl-wh dfse cut, thn bri bl resdl ring

MRLST: med gy-blk, sb blky-sb ply, mod frm-firm, mot, arg, v calc, abnt inoc, abnt cal frags, v tr bent; CHK: med gy-lt-med brn, mot, sb blky-sb ply, sft-sl frm, v calc; sting wi occ strgs, lt bl flr wi g bri bl-wh dfse cut, thn bri bl resdl ring

MRLST: med gy-blk, sb blky-sb ply, mod frm-firm, mot, arg, v calc, abnt inoc, cal frags, v tr bent; CHK: med gy-lt-med brn, mot, sb blky-sb ply, sft-sl frm, v calc; sting wi occ strgs, lt bl flr wi g bri bl-wh dfse cut, thn bri bl resdl ring





MD: 9.271
TVD: 7,243.39
Incl.: 89.07
Azim.: 359.77
VS: 1,977.54

WT IN 9.2/ OUT 9.2
VIS IN 42/ OUT 41

MD: 9.441
TVD: 7,245.93
Incl.: 89.22
Azim.: 359.86
VS: 2,147.53

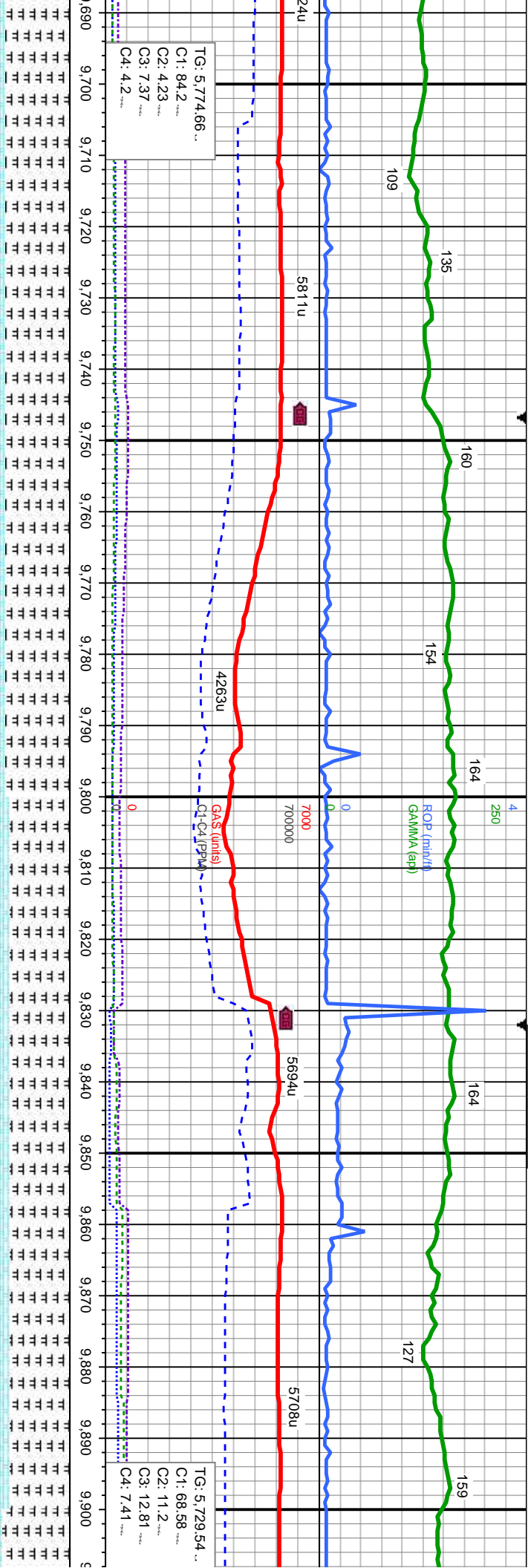
WT IN 9.2/ OUT 9.3
VIS IN 44/ OUT 41

d frm-frn, mot. arg, v calc, rr lnoc, abnt
brn, mot, sb blk-y-sb ply, sft-sl frm, v
bl-wh difse cut, thn bri bl resdl ring

MRL ST: med gy-blk sb blk-y-sb ply, mod sft-mod frm, mot, sl arg, v calc, occ
lnoc, occ cal frags, tr bent; CHK: med gy-lt tan, mot, sb blk-y-sb ply, sft-sl frm,
v calc; v fast difse; multi string bri bl-wh mky cut; thk bri bl-wh resdl ring

MRL ST: med gy-blk sb blk-y-sb ply, mod sft-mod frm, mot, sl
lnoc, occ cal frags, tr bent; CHK: med gy-lt tan, mot, sb blk-y-s
v calc; v fast difse; multi string bri bl-wh mky cut; thk bri bl-wh





WT IN 9.2/ OUT 9.3
VIS IN 43/ OUT 41

MD: 9.782.
TVD: 7.247.64.
Incl.: 89.9.
Azim.: 358.99.
VS: 2.488.51.

TVD (ft)

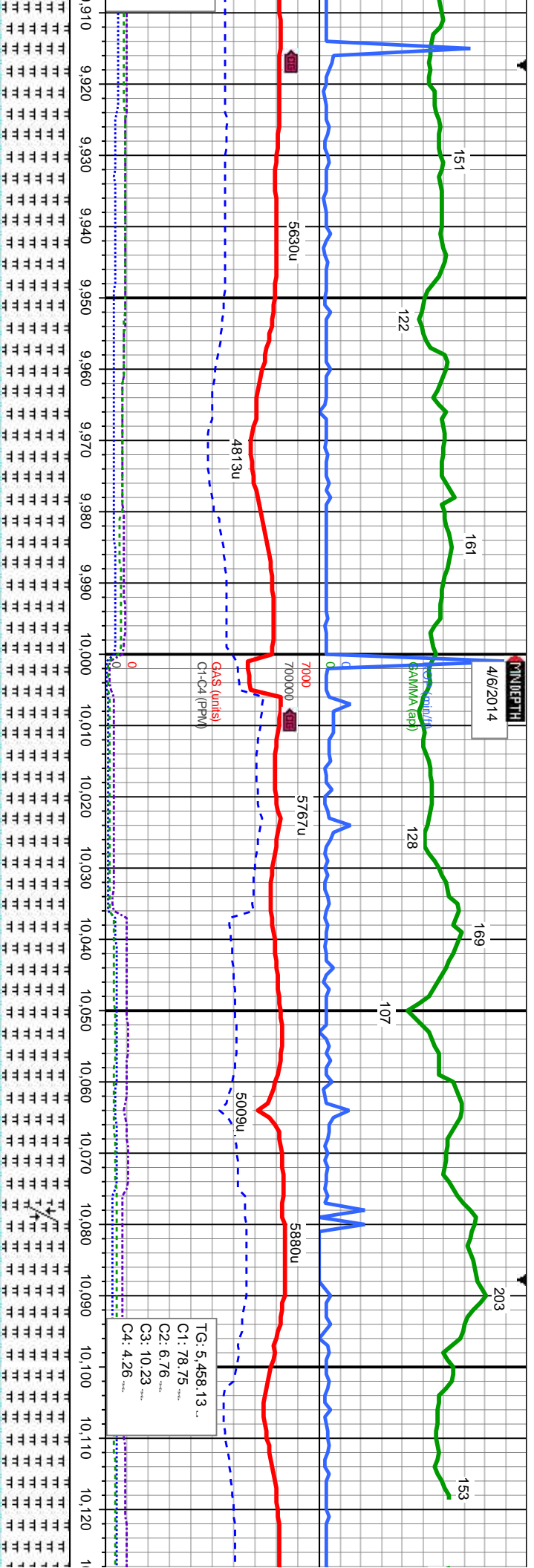
MUD DATA

WT: 9.3.
FV: 42.
PV: 11.
YP: 12.
CK: 1/1.
Sol: 6.
pH/ Temp: 9.6 @ 96F
Chl: 2.700

MRLST: med gy-blk, sb blk-y-sb pily, mod frm-frm, mot, sl arg, v calc, tr inoc,
r cal frags, tr bent; CHK: med gy-it tan, sl mot, sb blk-y-sb pily, sts-sl frm, v
calc; v fast difse; multi sting bri bl-wh mky cut; thk bri bl-wh resdl ring

MRLST: med gy-gy-blk, sb blk-y-sb pily, mod frm-frm, mot, sl arg, v calc, tr inoc,
r cal frags, tr bent; CHK: med gy-it tan, sl mot, sb blk-y-sb pily, sts-sl frm, v
calc; v fast difse; multi sting bri bl-wh mky cut; thk bri bl-wh resdl ring



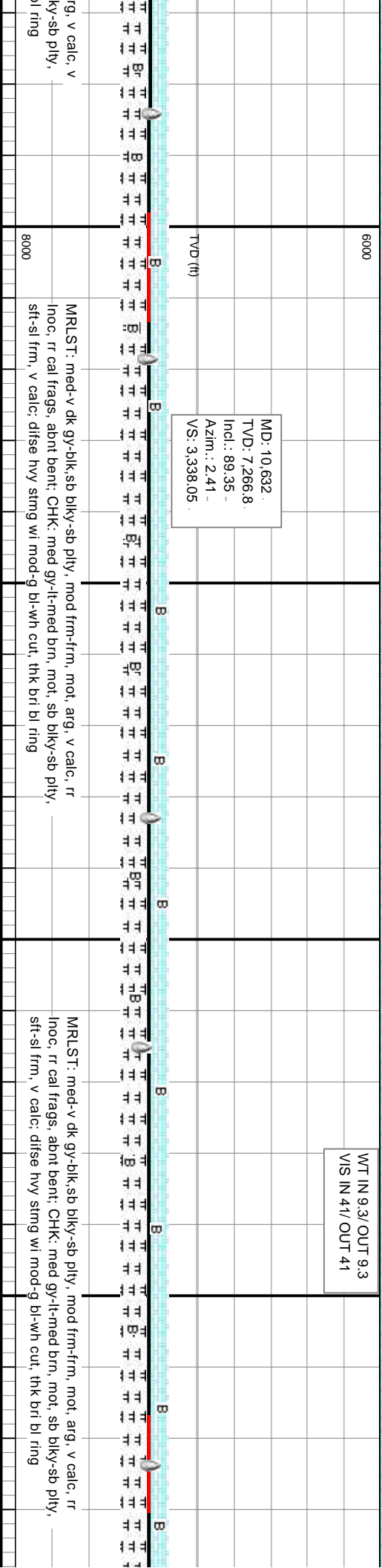
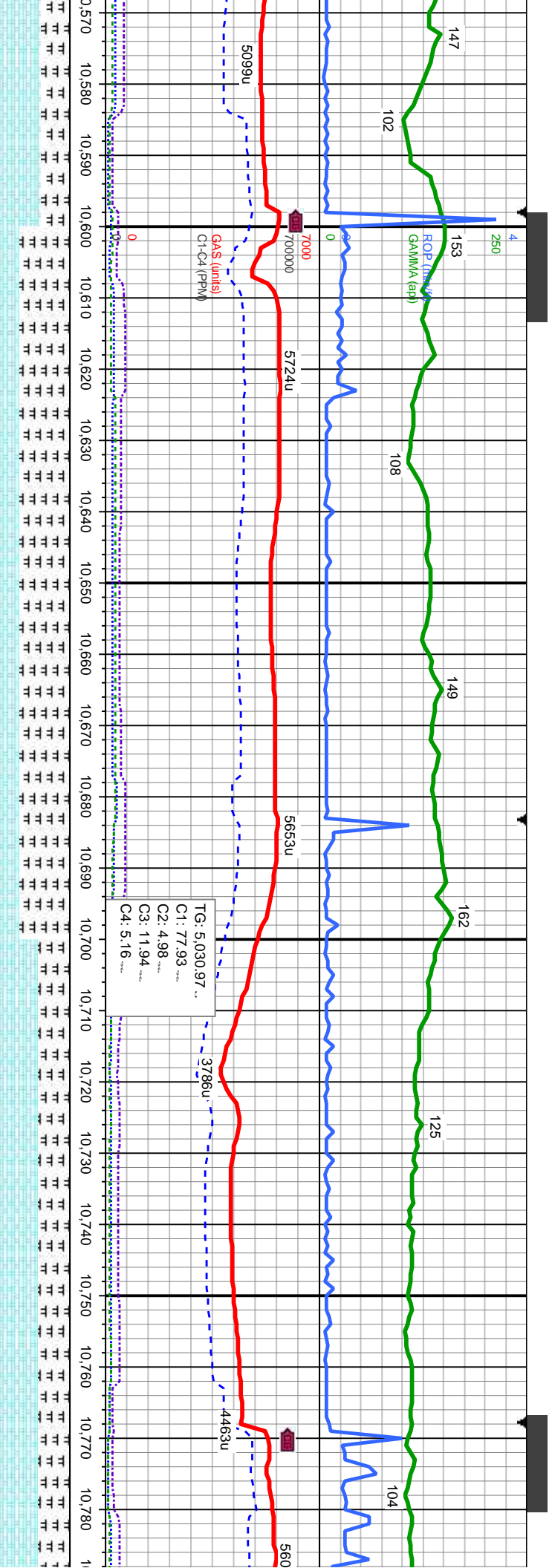


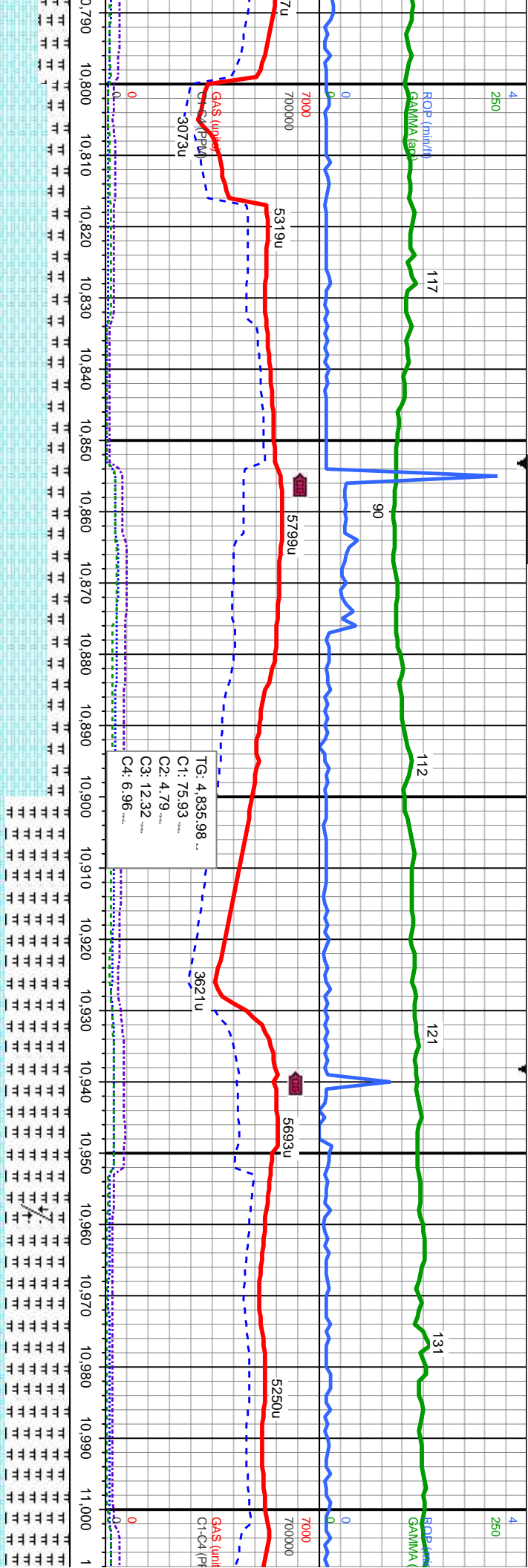
MRLST: med gy-gy-blk, sb blk-y-sb pily, mod frm-frm, mot, sl arg, v calc, tr cal frags, tr bent; CHK: med gy-lt tan, sl mot, sb blk-y-sb pily, sft-sl frm, v calc; v fast difse; multi string bri bl-wh mky cut; thk bri bl-wh resd ring

MRLST: med gy-gy-blk, sb blk-y-sb pily, occ pily, mod sft-mod frm, mot, sl arg, calc, tr bent; CHK: med gy-lt gy, sl mot, sb blk-y-sb pily, sft-sl frm, v calc; v fast difse; multi string bri bl-wh mky cut; thk bri bl-wh resd ring

MRLST: med-dk gy mod calc-calc, CHH frm, v calc; difse h





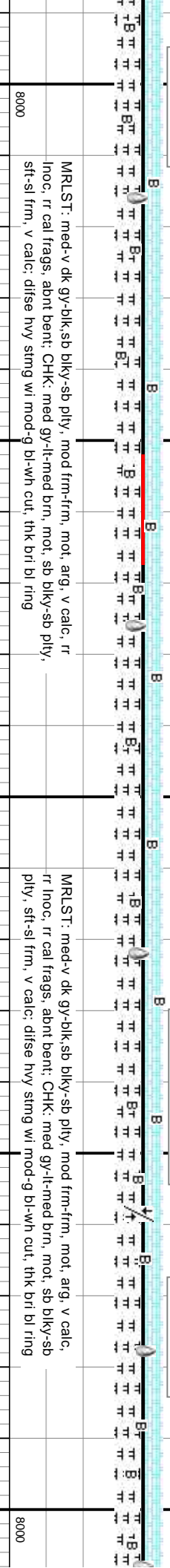


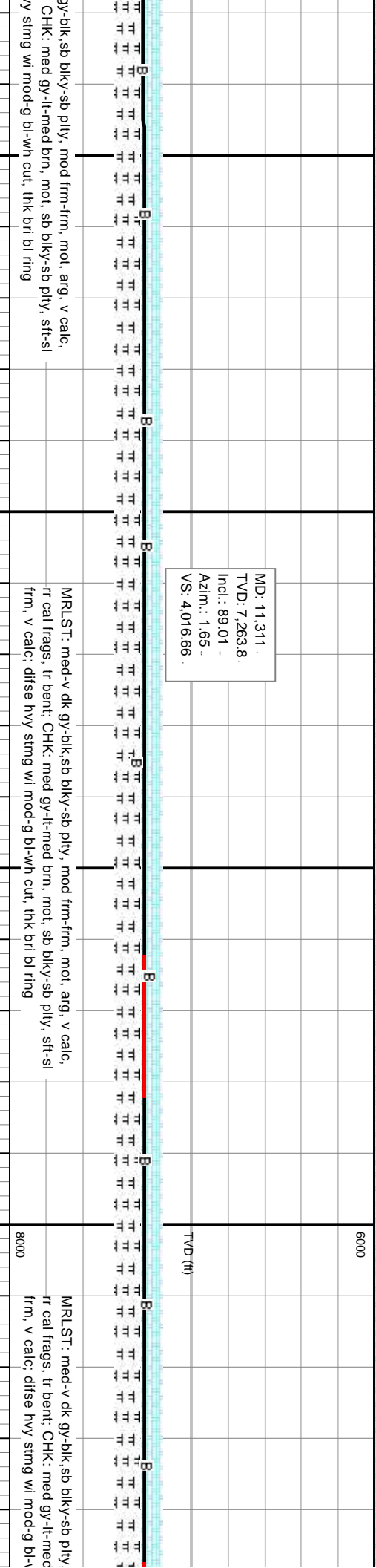
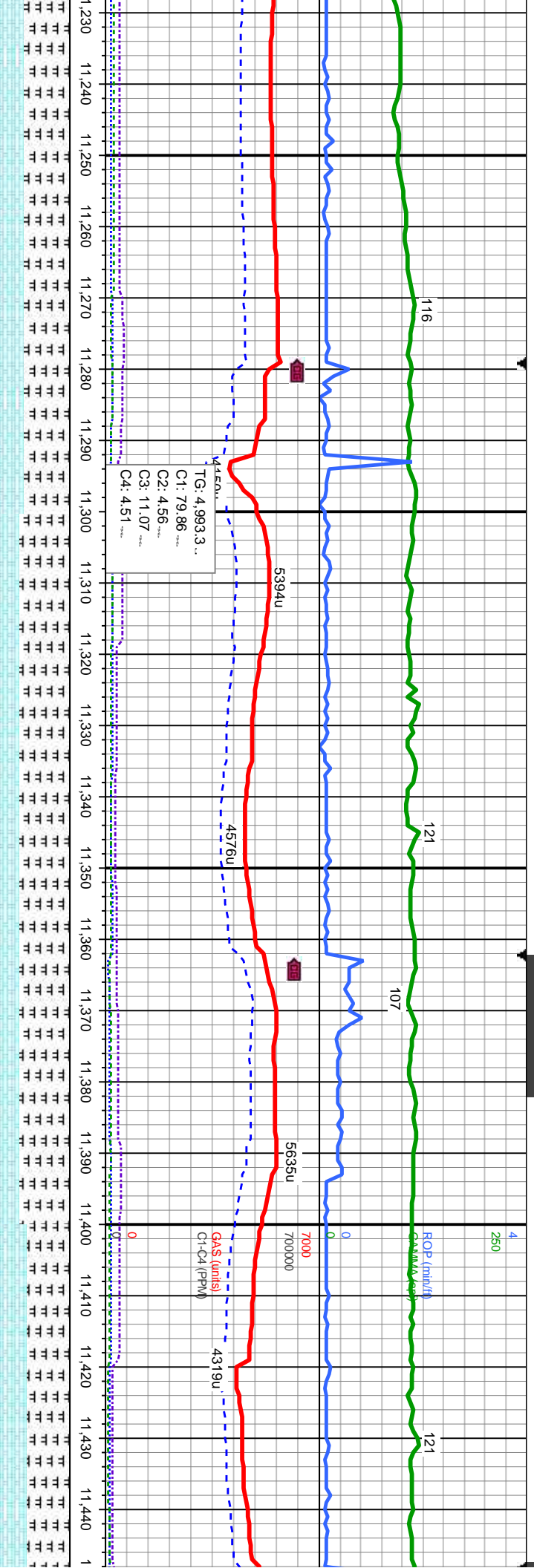
MD: 10.802.
TVD: 7.271.05.
Incl.: 89.75 -
Azim.: 2.13 -
VS: 3.507.92.

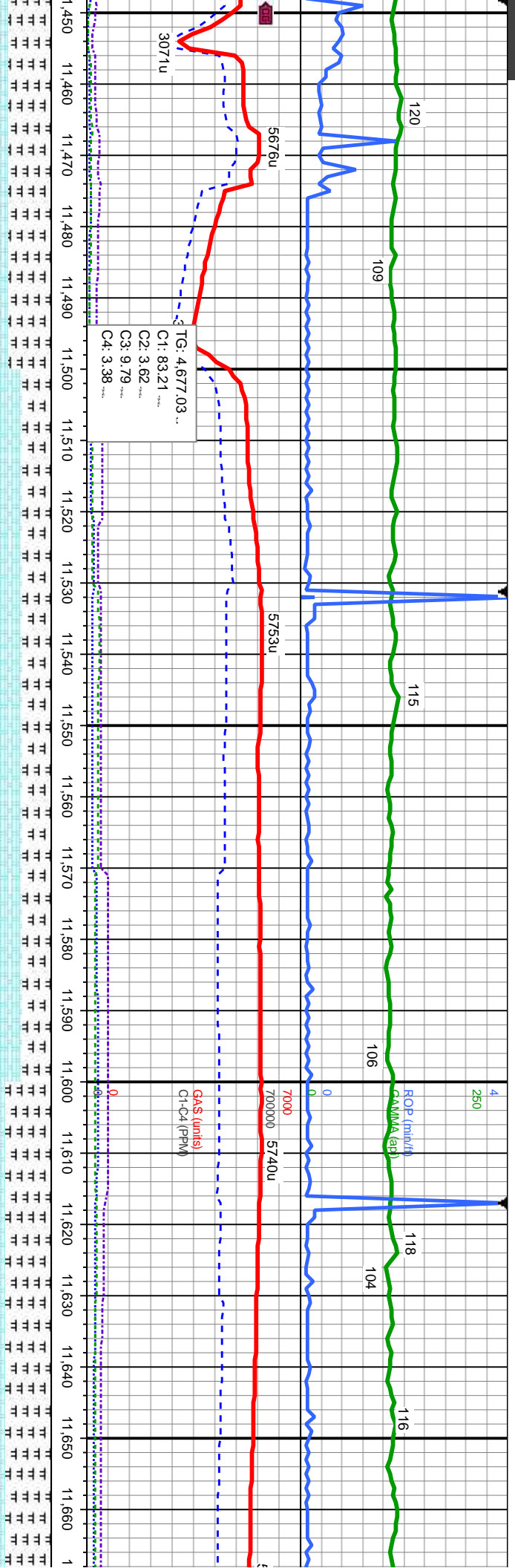
WT IN 9.3/ OUT 9.3
VIS IN 412/ OUT 42

FAULT 2 OF 2:
MD: 10.958'
TVD: 7.272'
VS: 3.664'
4' DOWNWARD THROW

MD: 10.972.
TVD: 7.271.62.
Incl.: 89.66 -
Azim.: 1.91 -
VS: 3.677.82.







WT IN 9.5/ OUT 9.6 VIS IN 45/ OUT 46		WT IN 9.1/ OUT 9.6 VIS IN 45/ OUT 45		6000		8000	
MD: 11,480 TVD: 7,261.84 Incl.: 88.91 Azim.: 1.69 VS: 4.185.6				TVD (ft)			
mod frm-frm, mot, arg, v calc, brn, mot, sb blk-y-sb pily, sft-sl wh cut, thk bri bl ring		MRLST: med-v dk gy-blk,sb blk-y-sb pily, mod frm-frm, mot, arg, v calc, rr cal frags, tr bent, CHK: med gy-ll-med brn, mot, sb blk-y-sb pily, sft-sl frm, v calc; difse hvy stmg w/ mod-g bl-wh cut, thk bri bl ring				MRLST: med-v dk gy-blk,sb blk-y-sb pily, mod frm-frm, mot, arg, v calc, rr cal frags, rr bent, v rr inog, CHK: med gy-ll-med brn, mot, sb blk-y-sb pily, sft-sl frm, v calc; difse hvy stmg w/ mod-g bl-wh cut, thk bri bl ring	



